REMARKS

Claims 1 to 20 are presently in this application. Entry of the amendment to the claims is respectfully requested.

Independent claims 1, 15 and 20 have been amended to incorporate the "cross-linking" limitation of claims 2 and 16, which have now been amended to provide that cross-linking is carried out by exposure to at least room temperature, support for which can be found in the specification at page 7, lines 24 to 29.

Applicant respectfully requests entry of this Amendment under 37 CFR 1.111 and reconsideration of this application, as amended.

The present invention relates to printable, coated plastic substrates coated with a printable coating composition layer which comprises: an anionic acrylic polymer; and epoxy acrylate in an amount sufficient to improve ink adhesion in said coating composition. The anionic acrylic polymer is cross-linked to an extent sufficient to improve the resistance of said coating to isopropyl alcohol and/or hot water, using a cross-linking agent.

REJECTIONS UNDER 35 USC 103(a)

1. The Examiner has rejected claims 1, 15 and 20 under 35 USC 103(a) as being unpatentable over U.S. Patent 5,662,985 to Jensen et al. (Jensen) in view of U.S. Patent 5,804,301 to Curatolo.

Jensen is cited by the Examiner as disclosing

i) a printable facestock structure corresponding to the printable plastic film of claim 1 or the label of claim 20 comprising

ii) a polymeric film substrate corresponding to the claims' substrate layer

iii) having on a first surface an adhesive anchor layer and on a second surface an ink base layer corresponding to the printable coating composition layer of the claimed invention wherein

iv) the ink base layer may be an iminated polymer of methyl methacrylate, an alkyl acrylate and an ethylenically unsaturated carboxylic acid corresponding to the iminated anionic acrylic polymer of the claimed invention;

v) coatings are applied to the substrate by any known method and wherein the substrate has been surface treated and primed, indicating a primer layer between the substrate and coating layer;

vi) coatings are applied at a coat weight of 0.9 to 1.1 g/m^2 (0.6g/1000 in^2); corresponding to the presently claimed dry coating weight of at least 0.1 g/1000 in^2;

vii) coatings are formulated with solid finely divided inorganic material, such as colloidal silica, to function as a slip agent corresponding to the dispersed particulates of claim 9; and

vii) an adhesive layer positioned adjacent the adhesive anchor layer as described in claim 20.

The Examiner acknowledges Jensen does not teach an ink base layer further comprising an epoxy acrylate and relies upon Curatolo as disclosing radiation curable compositions which may be deposited on polymeric films to improve their printability and other surface characteristics. Curatolo is cited as disclosing compositions comprising polyfunctional acrylate oligomers such as epoxy acrylates, which impart improved properties to the substrates on which the compositions are deposited.

The Examiner argues it would have been obvious to one skilled in the art to add an epoxy acrylate to Jensen's ink base layer "given that Curatolo specifically teaches that doing so imparts improved printability, ink adhesion, chemical resistance, moisture resistance and weathering resistance to plastic film substrates."

This rejection is respectfully traversed.

Jensen fails to disclose or suggest coatings, which contain epoxy acrylate as required by the present claims for the purpose of improving resistance of the coating to solvents like isopropyl alcohol or hot water. Moreover, Jensen while teaching the presence of an anionic acrylic polymer, fails to suggest or disclose cross-linking of this component as is now required by all pending claims. The Examiner relies upon Curatolo's disclosure of radiation curable compositions and their use to improve film characteristics. However, one skilled in the art familiar with Curatolo's compositions would lack incentive to combine it with Jensen inasmuch as Curatol 's compositions already provid improved ink adhesi n to a substrate (see column 11, lines 56-64). Moreover, the combined references further fail to disclose or suggest the subject

matter of claims 2 to 14 and 16 to 19 which rely upon temperature to effect cross-linking, because Curatolo is limited to radiation curable compositions such as electron beam curable or ultraviolet curable compositions.

In view of the above distinctions between Jensen as combined with Curatolo, and the present invention, Applicant respectfully submits that one skilled in the art would not be directed to the subject matter of claims 1 to 20. Accordingly, withdrawal of the rejection and allowance of these claims is respectfully requested.

2. The Examiner has rejected claims 2-5, 9-11, and 16-18 under 35 USC 103(a) as being unpatentable over Jensen in view of Curatolo and U.S. Patent 6,406,775 to Houde.

Jensen and Curatolo are cited as above. The Examiner acknowledges that Jensen and Curatolo fail to teach that the anionic acrylic polymer is cross-linked with a polyfunctional aziridine. Houde is cited as disclosing compositions used as printing media of improved abrasion and weather resistance, having a binder cross-linked using polyfunctional aziridine which reacts with reactive groups such as carboxylic acids and becomes completely incorporated into the coating without any leaching or outgassing. The Examiner argues that it would have been obvious to one skilled in the art to cross-link the anionic acrylic polymer, comprising ethylenically unsaturated carboxylic acid monomer, with a polyfunctional aziridine given Houde's disclosure that cross-linking the binder improves abrasion and weather resistance.

This rejection is respectfully traversed.

Jensen fails to disclose or suggest coatings which contain epoxy acrylate as required by the present claims for the purpose of improving resistance of the coating to solvents like isopropyl alcohol or hot water. Moreover, Jensen while teaching the presence of an anionic acrylic polymer, fails to suggest or disclose cross-linking of this component as is now required by all pending claims. The Examiner relies upon Curatolo's disclosure of radiation curable compositions and their use to improve film characteristics. However, one skilled in the art familiar with Curatolo's compositions would lack incentive to combine it with Jensen inasmuch as Curatolo's compositions already provide improved ink adhesion to a substrate (see column 11, lines 56-64). Moreover, the combined references further fail to disclose or suggest the subject

matter of claims 2 to 14 and 16 to 19 which rely upon temperature to effect cross-linking, because Curatolo is limited to radiation curable compositions such as electron beam curable or ultraviolet curable compositions. Houde, while teaching the use of polyfunctional aziridine cross-linking agent in ink jet printable coatings, appears limited to compositions which contain filler particles which serve to absorb inks. Accordingly, one skilled in the art, seeking to improve ink adhesion for substrates in the absence of such fillers, e.g., clear substrates, would not combine Houde with Curatolo and Jensen, because of an expectation that cross-linking to an extent sufficient to improve solvent and hot water resistance would also provide a product of unacceptably decreased ink adhesion in the absence of fillers. Moreover, Houde teaches away from the present invention inasmuch as it discloses at column 4, lines 32 to 34 that "[c]ationic ionomers are preferred for use in the present invention because the majority of the ink jet printing inks are ionic in nature." Thus, one skilled in the art combining Houde with Jensen and Curatolo would likely substitute cationic polymer for the "anionic acrylic polymer" required by the present claims.

In view of the above distinctions between Jensen as combined with Curatolo and Houde, and the present invention, Applicant respectfully submits that one skilled in the art would not be directed to the subject matter of claims 2-5, 9-11, and 16-18 by these references. Accordingly, withdrawal of the rejection and allowance of these claims is respectfully requested.

3. The Examiner has also rejected claims 2, 6-8, and 16-18 under 35 USC 103(a) as being unpatentable over U.S. Patent 5,662,985 to Jensen et al. (Jensen) in view of U.S. Patent 5,804,301 to Curatolo and U.S. Patent 5,883,193 to Karim.

Jensen and Curatolo are cited as above. The Examiner acknowledges that Jensen and Curatolo fail to teach that the anionic acrylic polymer is cross-linked with an epoxy silane using a catalyst such as imidazole.

Karim is cited as disclosing a thermosettable composition which allows adhesion to be maintained under conditions of high humidity. Karim's composition is described by the Examiner as comprising a polymerizable acrylic or methacrylic acid ester, an epoxy resin, a silane coupling agent and an accelerator, e.g., epoxy silanes used with an imidazole accelerator.

Imidazoles are insoluble in the methacrylate and epoxy components and useful because of their ability to extend composition shelf life. The Examiner argues it would have been obvious to one skilled in the art to cross-link the anionic acrylic polymer with an epoxy silane using imidazole accelerator given that such compositions allow adhesion to be maintained under conditions of high humidity and given that imidazoles are insoluble in the methacrylate and epoxy components and particularly suitable as accelerators because of their ability to extend the composition shelf life.

This rejection is respectfully traversed.

Jensen and Curatolo are cited by the Examiner as above, and Applicant relies on his arguments above respecting these references. Karim is cited as teaching the use of epoxy silane in adhesive used in bonding metal to glass. However, one skilled in the art familiar with the teachings of Jensen and Curatolo and seeking to improve printable coatings for plastic substrates would not likely rely upon the disparate metal to glass adhesive art for the purpose of providing a coating of both improved ink adhesion and improved resistance to isopropyl alcohol and/or hot water. Accordingly, one skilled in the art would not likely combine Jensen and Curatolo with Karim. Moreover, even if one skilled in the art were to rely on the metal to glass adhesive art, the cross-linking of a coating to improve solvent resistance would normally be expected by such a person to reduce ink adhesion to unacceptable levels.

In view of the above differences between the cited references and the present invention, Applicant respectfully submits that one skilled in the art would not be directed to the subject matter of claims 2, 6-8, and 16-18 by these references. Accordingly, withdrawal of the rejection and allowance of these claims is respectfully requested.

4. The Examiner has also rejected claims 1, 2, 12-14, 15, 16, and 19 under 35 USC 103(a) as being unpatentable over Jensen over Houde and Saint Victor. Jensen and Houde are cited as above. The Examiner acknowledges that Jensen and Houde do not teach that the ink base layer further comprises an epoxy acrylate. Saint Victor is cited as disclosing a substantially zero VOC, water-dispersible coating composition for printing or non-printing purposes and

comprising an epoxy acrylate oligomer. The Examiner observes Saint Victor's composition significantly reduced the amount of energy and time required to effect curing. The Examiner further notes the epoxy acrylate oligomer is formed by reacting epoxide with unsaturated acid such as acrylic or methacrylic acid, using epoxides such as glycidyl ethers of polyhydric alcohols, e.g., diglycidyl ether of diethylene glycol or dipropylene glycol, providing an epoxy methacrylate compound having a main chain of polyepoxide and both terminals of a methacrylate group. The reference also teaches addition of vinyl inhibitor such as hydroquinone to avoid premature or undesirable polymerization of the product or the reactants. The Examiner concludes it would have been obvious to add the thus-formed epoxy acrylate to Jensen's ink base layer composition given that Saint Victor specifically teaches an epoxy acrylate of low VOC which is water dispersible and significantly reduces the energy and time needed to cure the composition, while teaching the presence of hydroquinone to prevent undesired polymerization of the product or reactants.

This rejection is respectfully traversed.

Jensen and Curatolo are cited by the Examiner as above, and Applicant relies on his arguments above respecting these references. The Examiner's conclusion above that it would have been obvious to add Saint Victor's epoxy acrylate to Jensen's ink base layer composition is inapposite to the present facts for the following reasons.

One skilled in the art seeking to improve printability (including ink adhesion) and resistance to solvents of a coating composition would not rely upon Saint Victor's teachings which are related to a screen composition. A screen composition serves to prevent ink from reaching the substrate on which printing occurs. Only engraved surfaces (in which the screen composition is porous) will receive the ink (column 1, lines 19 to 31). Accordingly, one skilled in the art seeking to improve the ink adhesion of a coating would in no way rely upon Saint Victor's teachings related to screen compositions that function in an opposite way to the printable coating composition of the present invention. Moreover, Saint Victor's screen coating may be washed off with water (see, column 1, line 60), which is again opposite to the enhanced resistance to solvents enjoyed by the presently claimed compositions. Given th foregoing distinctions, it is respectfully submitted that one skilled in the art would lack any incentive to

arrive at this combination of references. Thus the references fail to disclose r suggest in any way the present invention as set out in claims 1, 2, 12-14, 15, 16, and 19. Accordingly, withdrawal of this rejection is respectfully requested.

CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that the claims as presently amended describe compositions that meets the requirements of patentability. Allowance of the present claims is therefore earnestly solicited.

Respectfully submitted,

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Date of Signature

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The following changes are being made to claims 1, 2, 15, 16 and 20:

1. (Amended) A printable plastic film, comprising:

   i) a plastic substrate layer;

   ii) a printable coating composition layer which comprises:

   a) an anionic acrylic polymer; and

   b) epoxy acrylate in an amount sufficient to improve ink adhesion in said coating composition,

wherein said anionic acrylic polymer is cross-linked to an extent sufficient to improve the resistance of said coating to isopropyl alcohol and/or hot water, using a cross-linking agent.

2. (Amended) The plastic film of claim 1 wherein said anionic acrylic polymer is cross-linked by exposure to at least room temperature [to an extent sufficient to improve the resistance of said coating to isopropyl alcohol and/or hot water, using a cross-linking agent].

15. (Amended) A printable coating composition for plastic film which comprises:

a) an anionic acrylic polymer; and

b) epoxy acrylate in an amount sufficient to improve ink adhesion in said coating composition,

wherein said anionic acrylic polymer is cross-linked to an extent sufficient to improve the resistance of said coating to isopropyl alcohol and/or hot water, using a cross-linking agent.

16. (Amended) The coating composition of claim 15 wherein said anionic acrylic polymer is cross-linked by exposure to at least room temperature [to an extent sufficient to improve the resistance of said coating to isopropyl alcohol and/or hot water using a cross-linking agent].

20. (Amended) A label comprising a printable plastic film containing:

i) a plastic substrate layer having two sides;

ii) a printable coating composition layer on one side of said plastic substrate layer, whose outer surface is printed, which coating composition comprises:

a) an anionic acrylic polymer;

b) epoxy acrylate in an amount sufficient to improve ink adhesion in said coating composition;

c) a[n optional] cross-linking agent for said anionic acrylic polymer; and

iii) an optional adhesive layer on the other side of said plastic substrate layer.